ATTACHMENT B: AREA OF REVIEW AND CORRECTIVE ACTION PLAN
40 CFR 146.84(b)

Facility Information

Facility name: CTV II

Facility contact: William Chessum / Technical Manager
(562) 999-8380 / William.chessum@crc.com

Well location: [redacted]

3.0 AoR and Corrective Action Plan

3.1 Computational Modeling Approach

The computational modeling workflow begins with the development of a three-dimensional representation of subsurface geology. It leverages well data (bottom and surface hole location, wellbore trajectory, well logs, etc.) for rendering structural surfaces into a geo-cellular grid, which also includes seismic information to understand faults and flow barriers. Attributes of the grid include porosity, permeability and facies distributions of reservoir lithologies by subzone, as well as observed fluid contacts and saturations for each fluid phase. This geologic model is often referred to as a static model, as it reflects the reservoir at a single moment. Carbon TerraVault Holdings LLC (CTV) licenses Schlumberger Petrel, industry-standard geo-cellular modeling software, for building and maintaining static models. The static model becomes dynamic in the computational modeler with the addition of:

- Fluid properties such as density and viscosity for each hydrocarbon and water phase
- Liquid and gas relative permeability
- Capillary pressure data
- Proposed injection well completions, injection rates and injection pressure over the life of the project
- Field pressure history
- Fluid geochemical analysis

- Rock and fluid compressibility

Results from the computational model are used to establish the area of review (AoR), the 'region surrounding the geologic sequestration project where underground sources of drinking water (USDWs) may be endangered by the injection activity' (EPA 75 FR 77230). In the case for the CTV II Storage project, the AoR encompasses the maximum aerial extent of the CO_2 plume (e.g., supercritical, liquid, or gaseous) plus a buffer zone, and this provides confidence that the corrective action well review and potential impact to the USDW is conservative and has been appropriately evaluated. Reservoir pressure will be at or beneath the initial/discovery pressure, minimizing the already minor potential for induced seismicity and ensure no elevated pressure post injection.

3.1.1 Model Background

Computational modeling was completed using Computer Modeling Group's (CMG) Equation of State Compositional Simulator (GEM). GEM is capable of modeling enhanced oil recovery, chemical EOR, geomechanics, unconventional reservoir, geochemical EOR and carbon capture and storage. GEM can model flow of three components (gas, oil and aqueous), multi-phase fluids, predict phase equilibrium compositions, densities, and viscosities of each phase. This simulator incorporates all the physics associated with handling of relative permeability as a function of interfacial tension (IFT), velocity, composition, and hysteresis. Computational modeling for the CO_2 plume utilized the Peng-Robinson Equation of State and the solubility of CO_2 in water is modeled by Henry's Law. The Peng-Robinson Equation of State establishes the interaction/solubility of CO_2 and residual gas in the reservoir. Solubility of CO_2 in aqueous phase was modeled by Henry's Law as a function of pressure, temperature, and salinity.

The plume model defines the potential quantity of CO_2 stored and simulates lateral and vertical movement of the CO_2 to define the AoR.

The simulator predicts the evolution of the CO_2 plume by:

1. Incorporating complex reservoir geometry and wells and utilizing a full field static geological three-dimensional characterization of the reservoir incorporating lithology, saturation, porosity, permeability and seismic interpretation.

2. Forecasting the CO_2 plume movement and growth by inputting the operating parameters into simulation (injection pressure and rates).

3. Assessing the movement of CO_2 after injection ceases and allowing the plume to reach equilibrium, including pressure equilibrium and compositions in each phase.

CMG's GEM software has been used in numerous CO_2 sequestration peer reviewed papers, including:

1. Simulation of CO_2 EOR and Sequestration Processes with a Geochemical EOS Compositional Simulator. L. Nghiem et al

2. Model Predictions Via History Matching of CO_2 Plume Migration at the Sleipner Project, Norwegian North Sea. Zhang, Guanru et al

3. Geomechanical Risk Mitigation for CO_2 Sequestration in Saline Aquifers. Tran, Davis et al.

3.1.2 Site Geology and Hydrology

[redacted].

[redacted] This shale has an average permeability of 0.04 md and porosity of 14.7%. [redacted] a very low matrix permeability which makes it a competent confining zone in preventing the upward migration of fluids.

[redacted]

Figure 3.1. Cross section showing stratigraphy and lateral continuity of major formations across the project area.

The Class VI injection wells will target injection [redacted]. [redacted]

[redacted]

[redacted]

Well data, open-hole well logs and core (**Figure 3.2**), define the subsurface geological characteristics of stratigraphy, lithology and rock properties. Reservoir performance information (production rates and volumes, reservoir and wellbore pressures) complements the static characterization by adding the dynamic components, such as reservoir continuity and hydrogeology.

[redacted]

Figure 3.2. Location of wells with open-hole log data [redacted] relative permeability or capillary pressure data used to develop the static and computational models.

3.1.3 Model Domain

A static geological model developed with Schlumbergers Petrel software, commonly used in the petroleum industry for exploration and production, is the computational modeling input. It allows the user to incorporate seismic and well data to build reservoir models and visualize reservoir simulation results. Model domain information is summarized in **Table 3.2**.

Table 3.2: Model domain information.

Coordinate System	California State Plane		
Horizontal Datum	North American Datum (NAD) 27		
Coordinate System Units	Feet		
Zone	Zone 2		
FIPSZONE	[redacted]	**ADSZONE**	[redacted]
Coordinate of X min	[redacted]	**Coordinate of X max**	[redacted]
Coordinate of Y min	[redacted]	**Coordinate of Y max**	[redacted]
Elevation of bottom of domain	[redacted]	**Elevation of top of domain**	[redacted]

The geo-cellular grid is uniformly spaced throughout the [redacted] model area (**Figure 3.3**) at 100 feet x 100 feet, dynamic modeling upscaled to 200 feet x 200 feet. These grid dimensions allow for adequate resolution of plume development. Finer resolution for the grid will prevent the simulation from running efficiently and a coarser grid will not adequately simulate plume movement. [redacted]

[redacted]. [redacted]. [redacted].

[redacted]

Figure 3.3. Plan view of the model boundary and geo-cellular grid used to define the project AoR.

A constant vertical cell height of 5 feet was utilized over the model domain to generate grid layers within the model as shown in **Figure 3.4**. The 5-foot cell height provides the vertical resolution necessary to capture significant lithologic heterogeneity (sand versus shale) which helps to ensure accurate upscaling of log data and distribution of reservoir properties in the static model. Flow model vertical thickness within the model depends on the vertical proportion of each sandy body, average thickness is 9 feet. **Figure 3.5** shows a comparison of open-hole log data and the associated upscaled logs for a well within the AoR.

[redacted]

Figure 3.4. Static model layering for [redacted]

[redacted]

Figure 3.5. Well [redacted] upscaled logs versus open-hole logs.

3.1.4 Porosity and Permeability

Wireline log data was acquired with measurements that include but are not limited to spontaneous potential, natural gamma ray, borehole caliper, compressional sonic, resistivity as well as neutron porosity and bulk density.

Formation porosity is determined one of two ways: from bulk density using 2.65 g/cc matrix density as calibrated from core grain density and core porosity data, or from compressional sonic using 55.5 µsec/ft matrix slowness and the Raymer-Hunt equation.

Volume of clay is determined by spontaneous potential and is calibrated to core data.

Log-derived permeability is determined by applying a core-based transform that utilizes capillary pressure porosity and permeability along with clay values from XRD or FTIR. Core data from two wells with 13 data points was used to develop a permeability transform (**Figure 3.6**). An example of the transform from core data is illustrated in **Figure 3.7**.

[redacted]

Figure 3.6. Location of wells with core data used for permeability transform.

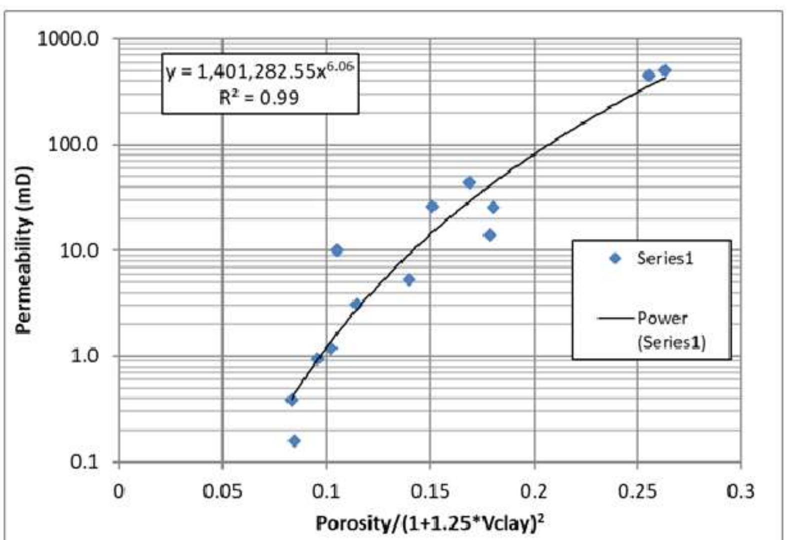

Figure 3.7. Porosity and permeability data from capillary pressure analysis [redacted].
A permeability transform calculates permeability from log-based porosity.

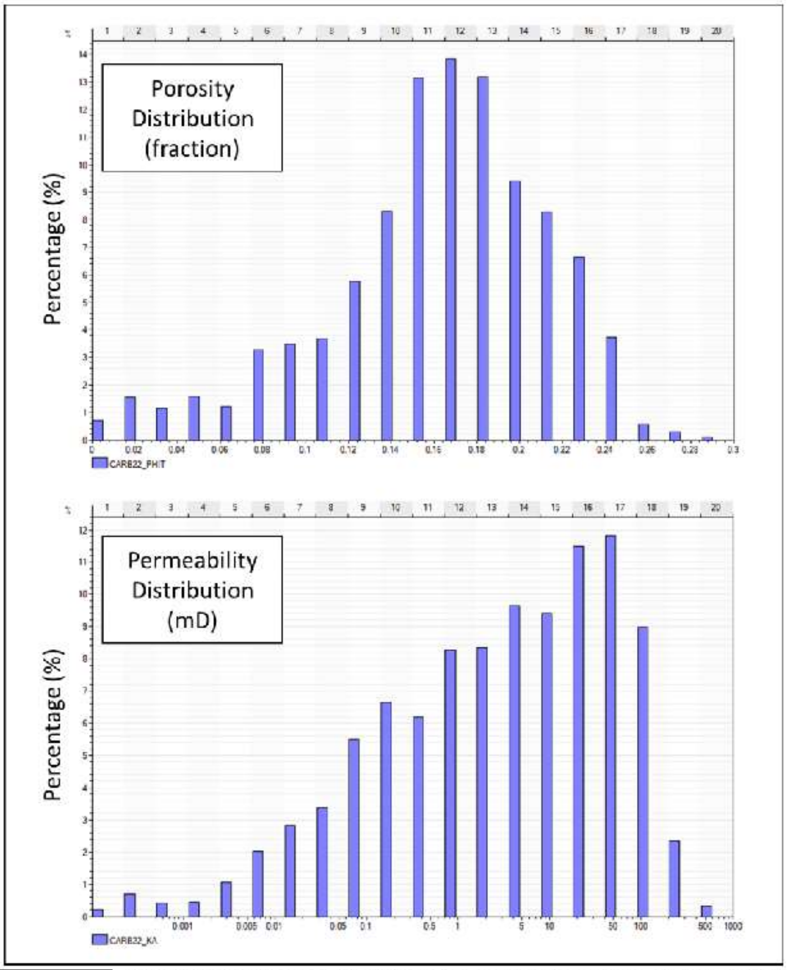

Figure 3.8. [redacted] porosity and permeability distribution in the static model.

Figure 3.8 shows porosity and permeability histograms for [redacted]. Porosity is derived from open-hole well log analysis and permeability is a function of porosity and clay volume. **Figure 3.9** shows the distribution of permeability and porosity using Sequential Gaussian simulation (kriging) within the static model. [redacted].

[redacted]

Figure 3.9. Section through the static grid showing the distribution of porosity and permeability in the reservoir.

3.1.5 Constitutive Relationships and Other Rock Properties

[redacted]

[redacted]

With gas and water present in the reservoir only, one set of two-phase relative permeability relationships is needed to determine the flow characteristics of each component and/or phase, where Krw (water relative permeability) and Krg (gas relative permeability) is a function of gas saturation. Relative permeability data acquired from core flood of well [redacted] two of three samples results used for normalizing, averaging and denormalizing process. Corey correlation used to smooth the final curves. Capillary pressure data acquired from well [redacted] measured by centrifuge method, converted to reservoir condition. **Figure 3.10** shows the relative permeability curves and **Figure 3.11** shows the capillary pressure curve used in the computational model.

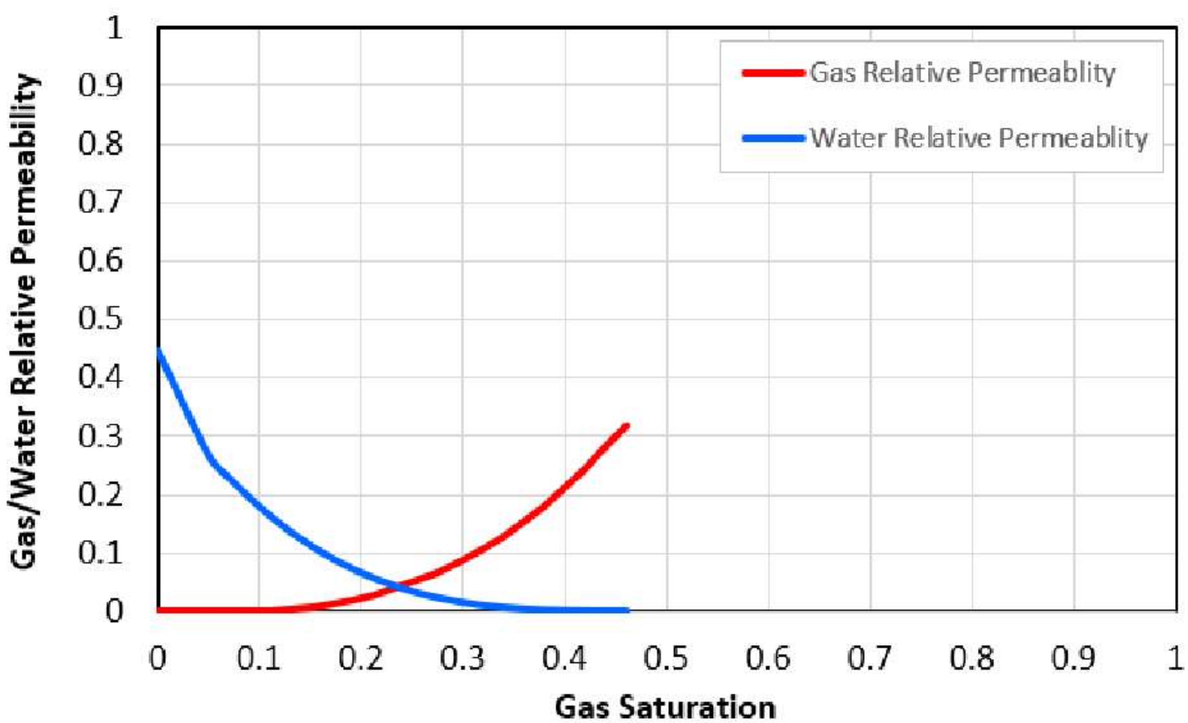

Figure 3.10. Relative permeability curves for Gas-Water System.

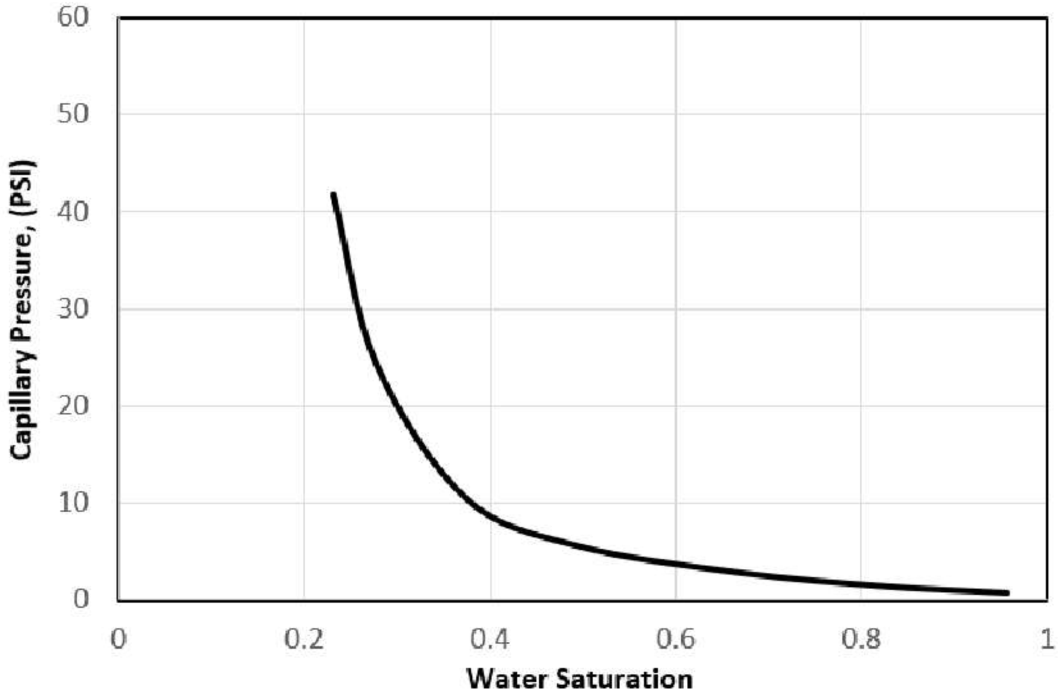

Figure 3.11. Capillary Pressure Curve.

3.1.6 Mineralization

Previous studies into reactive transport modeling and geochemical reaction in CCS have shown that the amount of CO_2 trapped by mineralization reactions is extremely small over a 100 year post injection time frame (IPCC, 2005: IPCC Special Report on Carbon Dioxide Capture and Storage, prepared by Working Group III of the Intergovernmental Panel on Climate Change) for sandstone reservoirs. For the sake of computational efficiency and the minor expected effect on the AoR, reactive transport was not included as a part of the compositional simulation modeling.

3.1.7 Boundary Conditions

[redacted]. These conditions were based on the following:

1. [redacted] is continuous through the area, has a low permeability (1 mD) and has confined oil and gas operations.
2. [redacted]
   i. [redacted]

ii. [redacted]

[redacted]

3.1.8 Initial Conditions

Initial model conditions (start of CO_2 injection) of [redacted]. Initial conditions for the model are given in **Table 3.4**.

Table 3.4: Initial conditions (start of CO2 Injection).

Parameter	Value or Range	Units	Corresponding Elevation (ft MSL)	Data Source
Temperature	218	Fahrenheit	[redacted]	Fluid Analysis
Formation pressure	1,200	Pounds per square inch	[redacted]	Pressure Test
Fluid density	61	Pounds per cubic foot	[redacted]	Water analysis
Salinity	15,000	Parts per million	[redacted]	Water analysis

3.1.9 Operational Information

Details on the injection operation are presented in **Table 3.5**.

Table 3.5: Operating details.

[redacted]

*If planned injection rates change year to year, add rows to reflect this difference, and include an average injection rate per year (or interval if applicable).

3.1.10 Fracture Pressure and Fracture Gradient

[redacted] CTV will conduct a step rate test in the injection zone as part of the pre-operational testing plan to confirm this fracture pressure gradient.

At this time, no fracture gradient information has been found for the confining zone. CTV will conduct a step rate test for the Confining zone as per the pre-operational testing plan.

CTV will ensure that the injection pressure is beneath 90% of the fracture gradient at the top of perforations in the injection wells (**Table 3.6**). CTV expects to operate the wells with a planned bottom hole injection pressure well below the maximum allowable injection pressure calculated using the fracture gradient and safety factor.

Table 3.6: Injection pressure details.

Injection Pressure Details	**Injection Well 1** [redacted]	**Injection Well 2** [redacted]
Fracture gradient (psi/ft)	0.70	0.70
Maximum allowable bottomhole injection pressure (90% of fracture pressure) (psi)	6,021	6,061
Elevation corresponding to maximum injection pressure (ft TVD)	9,557	9,620
Elevation at the top of the perforated interval (ft TVD)	9,557	9,620
Planned bottom hole injection pressure at top of perforations (psi)	1541 - 4675	1469 - 4645
Planned bottom hole injection gradient at top of perforations (psi/foot)	0.16 - 0.49	0.15 - 0.48

3.2 Computational Modeling Results

3.2.1 Predictions of System Behavior

The following maps (**Figure 3.13**) and cross-sections (**Figure 3.14)** show the computational modeling results and development of the CO_2 plume at different time-steps. The boundaries of the AoR have been defined with a 0.05 CO_2 global mole fraction cutoff plus a buffer zone.

As shown in **Figure 3.13** and **Figure 3.14**, the CO_2 extent is largely defined by Year 32 after the end of injection. The majority of the CO_2 injectate remains as super-critical CO_2 (86%) with the remaining portion of the CO_2 dissolving in the formation brine over the simulated 100 years post injection. **Figure 3.15** shows the cumulative storage for each of the mechanisms.

[redacted]

Figure 3.13. Plume development through time: 1-year, 5-year, 10-year, 15-year, 20-year, 23-year (end of injection), 32-year post injection, and 100-year post injection.

[redacted]

Figure 3.14. Cross-sections showing the plume development at varying times through the project. Location of A-A' line of section is shown on the inset map in **Figure 3.4**

[redacted]

Figure 3.15. CO_2 storage mechanisms in the reservoir.

3.2.2 Model Calibration and Validation

[redacted].

Additionally, the scenarios listed in the **Table 3.7** were run varying major inputs to the simulation to see whether it had any significant impact on the AoR boundary. The results from the different scenarios were reviewed and showed varying final CO_2 storage amount but minimal impact to the AoR boundary.

Table 3.7: Simulation sensitivity scenarios.

Scenario	CO_2 plume & AoR impact
Porosity: 10% reduction from base case	Minimal Impact
Porosity: 10% increase from base case	Minimal Impact
Permeability: 10% reduction from base case	Minimal Impact
Permeability: 10% increase from base case	Minimal Impact

These scenarios demonstrate that the AoR, as defined by the maximum extent of CO_2 injectate plus a buffer, is consistent for a range of scenarios. This provides confidence that the corrective action well review and potential impact to the USDW is conservative and has been appropriately evaluated.

3.2.3 AoR Delineation

The AoR was determined by the largest extent of the CO_2 plume from computational modeling results plus a buffer zone. [redacted].

Figure 3.16 shows the AoR, injectors and offset monitoring wells. These monitoring wells were selected to both track the plume and measure reservoir pressure to understand the Pressure and CO_2 plume development:

1. By integrating the reservoir pressure increase with the injected volume, CTV will complete a material balance to verify the pore volume and AoR edges.

2. [redacted].

If the reservoir pressure increase associated with the injected volume does not follow the predicted trend from computational modeling, CTV will reassess the AoR.

[redacted]

Figure 3.16. Map showing the location of injection wells and plume monitoring wells.

3.3 Corrective Action

3.3.1 Tabulation of Wells within the AoR

[redacted]. As such, there are sufficient records for wells drilled in the study area. There have been no undocumented historical wells found in the AoR.

CTV accessed internal databases as well as California Geologic Energy Management Division (CalGEM) information to identify and confirm wells within the AoR.

Tables 3.8 provide counts of the AoR wellbores with a description that includes status and type, for each wellbore with a unique API-12 identifier. **Appendix B-1** provides a complete list of all API-12 wellbores within the AoR. As required by 40 CFR 146.84(c)(2), the well table in **Appendix B-1** describes each well's type, construction, date drilled, location, measured depth, true vertical depth, completion record [redacted], record of plugging, requirement for corrective action, if necessary. CTV also identifies well work to be completed during the pre-operational testing phase.

Table 3.8. Wellbores in the AoR by status.

[redacted]

Figure 3.17. Wells penetrating [redacted] reviewed for corrective action. The well requiring corrective action prior to injection is identified by a magenta circle.

3.3.2 Protection of USDW

For the CTV II Storage Project, CTV assessed the USDW protection by evaluating all wellbores that penetrate [redacted]. All wells within the AoR meet the criteria below, ensuring the protection of the USDW.

1. Surface or intermediate casing over the USDW
2. If well is abandoned, cement plug across base of USDW
3. Cement in the annulus:
    a. Intermediate casing – cement above the above the surface casing shoe.
    b. Adequate annular cement within the confining [redacted].

3.3.3 Wells Penetrating the Confining Zone

The depth of the confining zone in each of the wells penetrating [redacted] was determined through open-hole well logs utilizing the deviation survey. All wells in the AoR penetrate [redacted] confining zone.

3.3.4 [redacted] Isolation

[redacted]. Wellbores that meet these criteria are identified for abandonment in **Appendix B-1**.

Appendix B-2 provides the plugging procedure that will be used to abandon these wells along with well-specific plugging plan tables that identify the number of plugs, placement method, cement type, density, and volume for the wells to be abandoned during pre-operational testing [redacted]

[redacted]

Figure 3.18. Wells to be abandoned prior to injection.

3.3.5 Corrective Action Assessment of Wells in AoR

The corrective action assessment included the generation of detailed casing diagrams for each wellbore, review of all perforations, assessment of cement tops for each casing string, and determination of cement plug depths.

[redacted] shown in **Figure 3.17** will require a corrective action plan to evaluate whether and how remediation will be performed. The plan will be provided during pre-operational testing.

3.3.6 Plan for Site Access

CTV has obtained surface access rights for the duration of the project.

3.3.7 Corrective Action Schedule

Corrective action for all wells within the AoR will be completed before CO_2 is injected in the reservoir. This will ensure that CO_2 is confined to the injection zone for the entire AoR, protecting the overlying USDW and ensuring confinement.

Through time, if the plume development is not consistent with the predicted results, computational modeling will be updated to reassess the AoR. In this event, all wells in the updated AoR will be subject to the Corrective Action Plan and be remediated if necessary.

3.4 Reevaluation Schedule and Criteria

3.4.1 AoR Reevaluation Cycle

CTV will reevaluate the above described AoR at a minimum every five years during the injection and post-injection phases, as required by 40 CFR 146.84 (e).

Simulation study results are reviewed when operating data is acquired. Preparation of necessary operational data forthe review includes injection rates and pressures, CO_2 injectate concentrations, and monitoring well information (storage reservoir and overlying dissipation intervals).

Dynamic operating and monitoring data that will be incorporated into future reevaluation will include:

1. Pressure data from monitoring wells that constrain and define plume development.

2. CO_2 content/saturation from monitoring wells. This data may be acquired with direct aqueous measurements and cased hole log results that will constrain and define plume development.

3. Injection pressures and volumes. The injection pressures and volumes in the computational model are maximum values. If the actual rates are lower than expected, the plume will develop at a slower rate than expected and be reflected in the pressure and CO_2 concentration data in 1 and 2 above.

4. A review of the full suite of water quality data collected from monitoring wells in addition to CO_2 content/saturation (to evaluate the potential for unanticipated reactions between the injected fluid and the rock formation).

5. Review and submission of any geologic data acquired since the last modeling effort, including any additional site characterization performed for future injection wells.

6. Reevaluation modeling results will be compared with the most recent modeling (i.e., from the most recent AoR reevaluation). A report describing the comparison of the modeling results will be provided to the EPA with a discussion on whether the reulsts are consistent.

7. Description of the specific actions that will be taken if there are discrepancies between monitoring data and prior modeling results (e.g., remodel the AoR, update all project plans, perform additional corrective action if needed, and submit the results to EPA).

Re-evaluation results will be compared to the original results to understand dynamic inputs affecting plume development and static inputs that would impact injectivity and storage space. Static inputs that may potentially be considered to understand discrepancies between initial and re-evaluation computational models could include permeability, sand continuity and porosity. Although the AoR has been fully delineated, all inputs to the static and dynamic model will be reviewed.

As needed, CTV will review all of the plans that are impacted by a potential AoR increase such as Corrective Action and Emergency and Remedial Response. For corrective action, all wells potentially impacted by a changing AoR will be addressed immediately.

3.4.2 Triggers for AoR Reevaluations Prior to the Next Scheduled Reevaluation

An ad-hoc re-evaluation prior to the next scheduled re-evaluation will be triggered if any of the following occur:

1. Changes in pressure or injection rate that are unexpected and outside three (3) standard deviations from the average will trigger a new evaluation of the AoR.

2. Difference between the computation modeling and observed plume development:

    a. Unexpected changes in fluid constituents or pressure outside [redacted] that are not related to well integrity.

    b. Reservoir pressures increase versus injected volume is inconsistent with computational modeling results.

    c. Any other activity prompting a model recalibration.

3. Seismic monitoring anomalies within two miles of the injection well that are indicative of:

    a. The presence of faults near the confining zone that indicates propagation into the confining zone.

    b. Events reasonably associated with CO_2 injection that are greater than M3.5.

2. Exceeding 90% of the geologic formation fracture pressure in any injection or monitoring wells.

3. Detection of changes in shallow groundwater chemistry (e.g., a significant increase in the concentration of any analytical parameter that was not anticipated by the AoR delineation modeling).

4. Initiation of competing injection projects within the same injection formation within a 1- mile radius of the injection well (including when additional CTV injection wells come online);

5. A significant change in injection operations, as measured by wellhead monitoring;

6. Significant land-use changes that would impact site access; and

7. Any other activity prompting a model recalibration.

CTV will discuss such events with the UIC Program Director within six months of an event to determine if an AoR re-evaluation is required. If an unscheduled re-evaluation is triggered, CTV will perform the steps described at the beginning of this section of the Plan.

AREA OF REVIEW AND CORRECTIVE ACTION PLAN - FIGURES

[redacted]

Figure 3.1. Cross section showing stratigraphy and lateral continuity of major formations across the project area.

[redacted]

Figure 3.2. Location of wells with open-hole log data [redacted] relative permeability or capillary pressure data used to develop the static and computational models.

[redacted]

Figure 3.3. Plan view of the model boundary and geo-cellular grid used to define the project AoR.

[redacted]

Figure 3.4. Static model grid layering of [redacted].

[redacted]

Figure 3.5. Well [redacted] upscaled logs versus open-hole logs.

[redacted]

Figure 3.6. Location of wells with core data used for permeability transform.

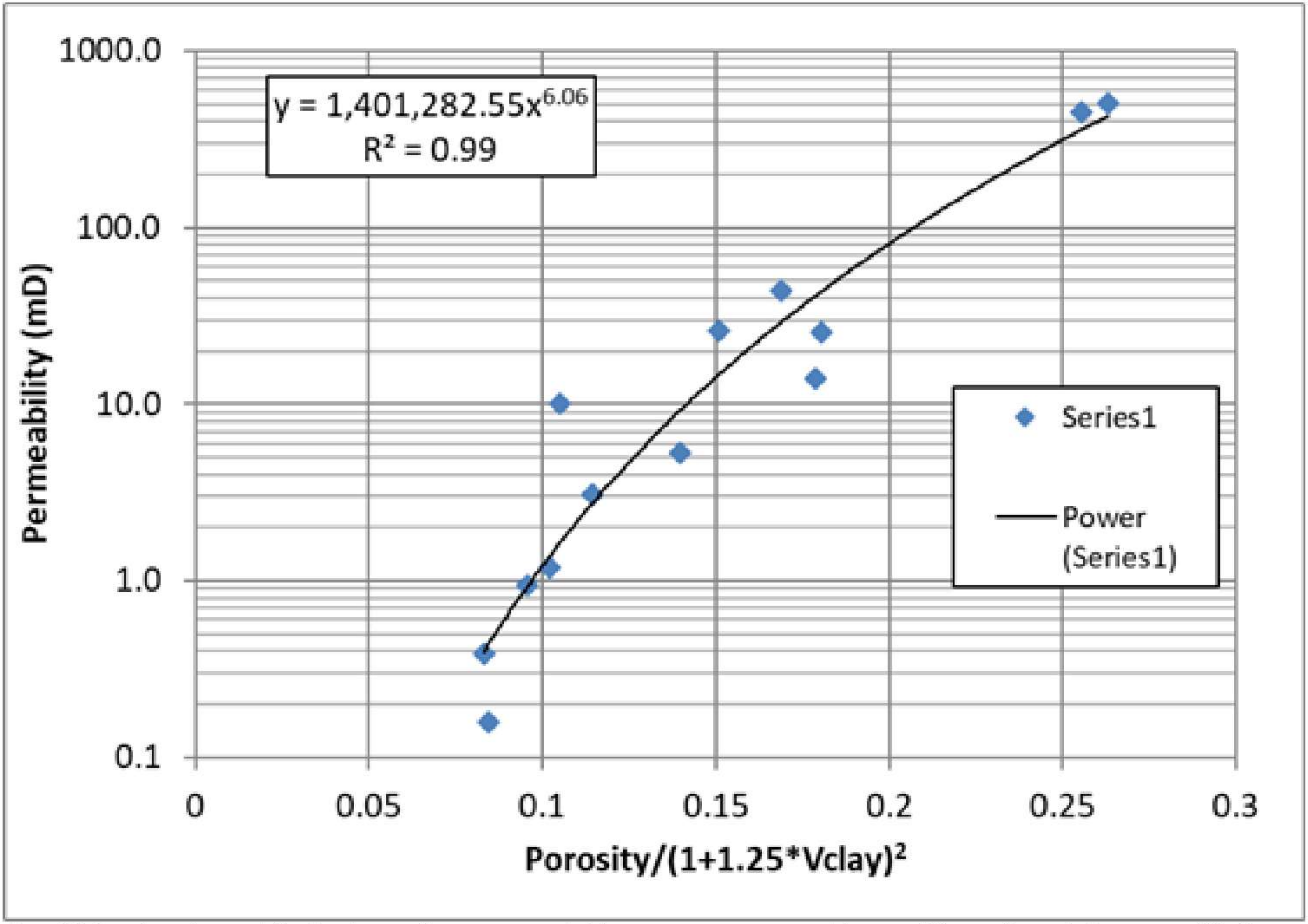

Figure 3.7. Porosity and permeability data from capillary pressure analysis [redacted]. A permeability transform calculates permeability from log-based porosity.

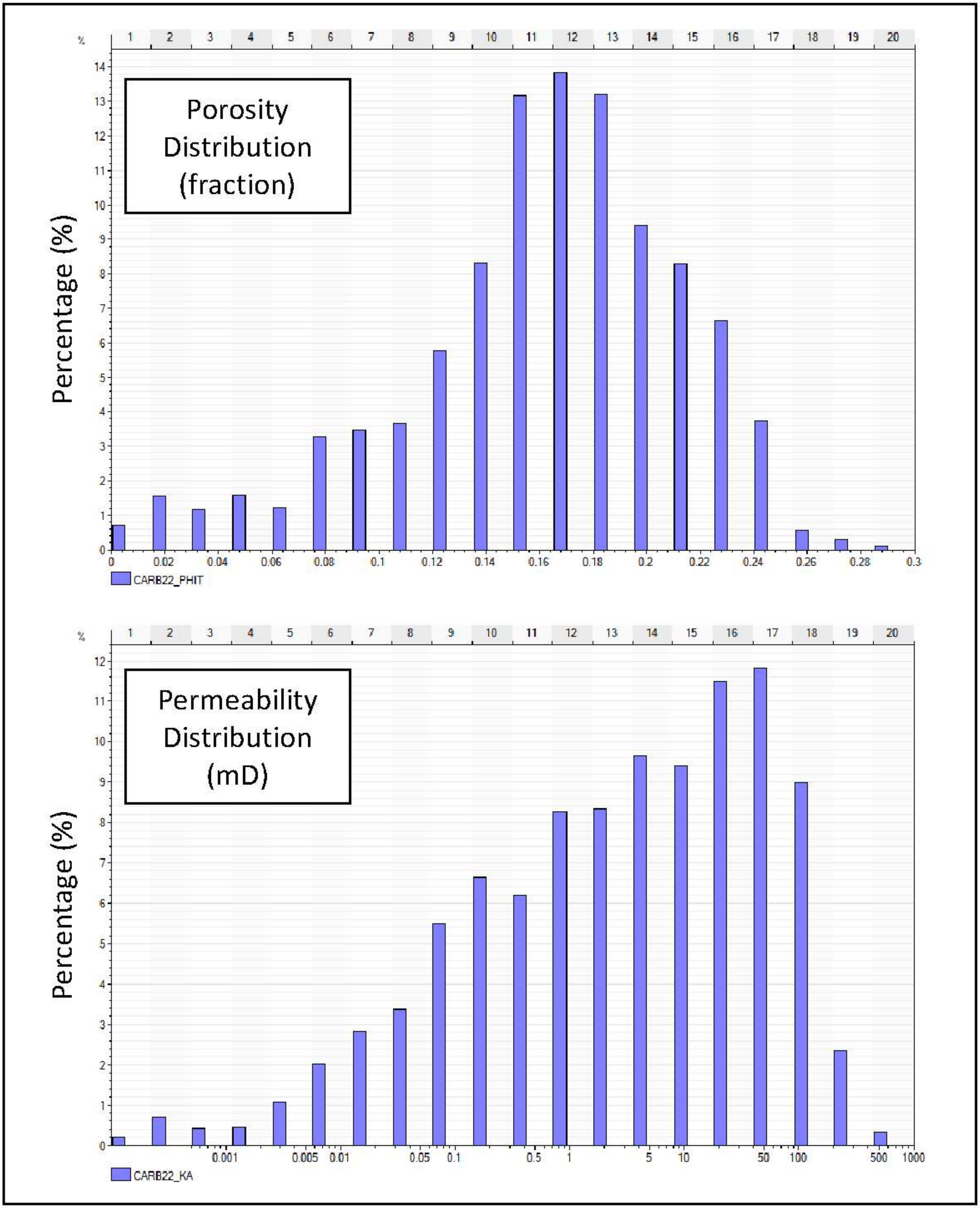

Figure 3.8. [redacted] porosity and permeability distribution in the static model.

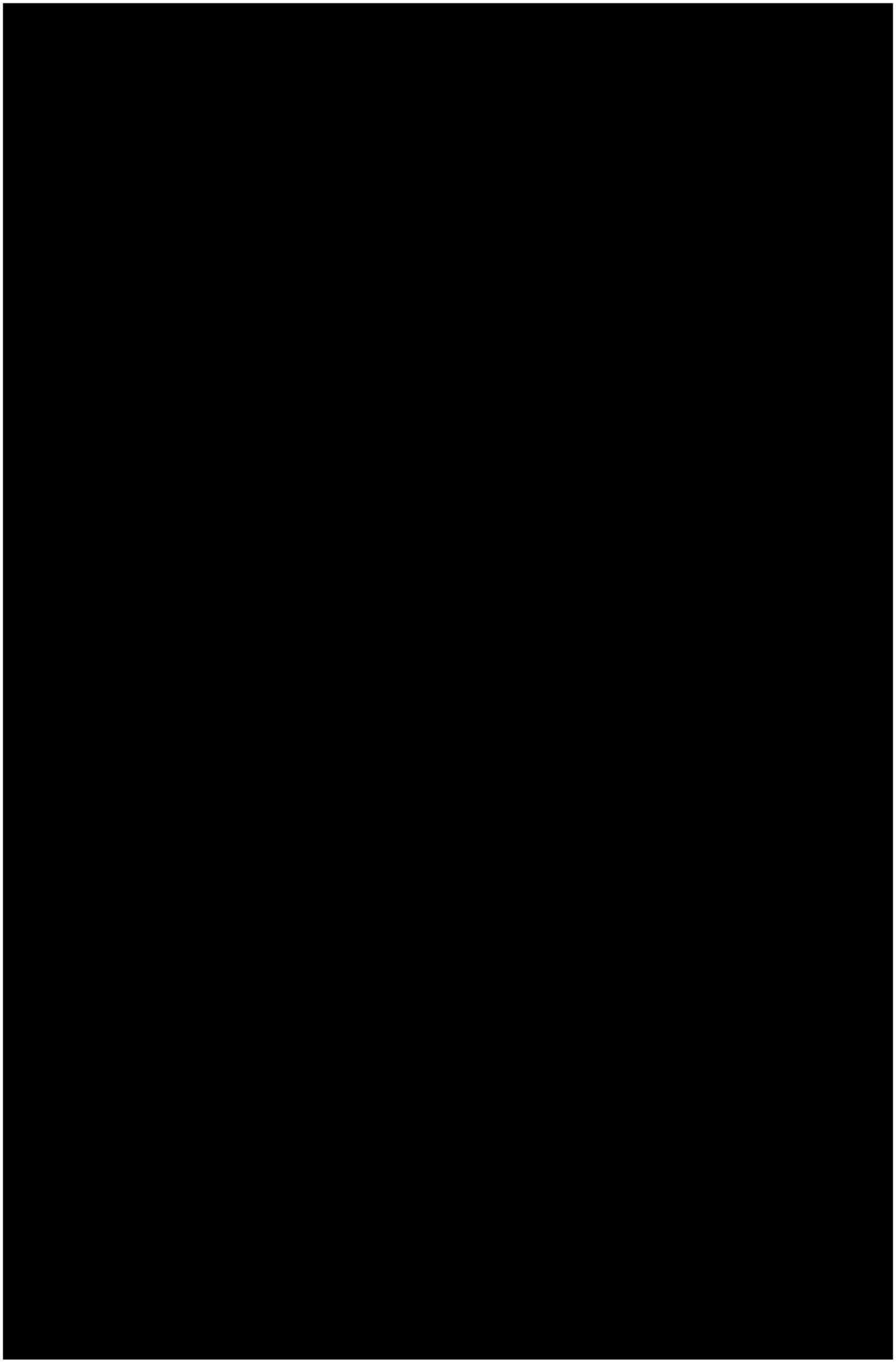

Figure 3.9. Section through the static grid showing the distribution of porosity and permeability in the reservoir.

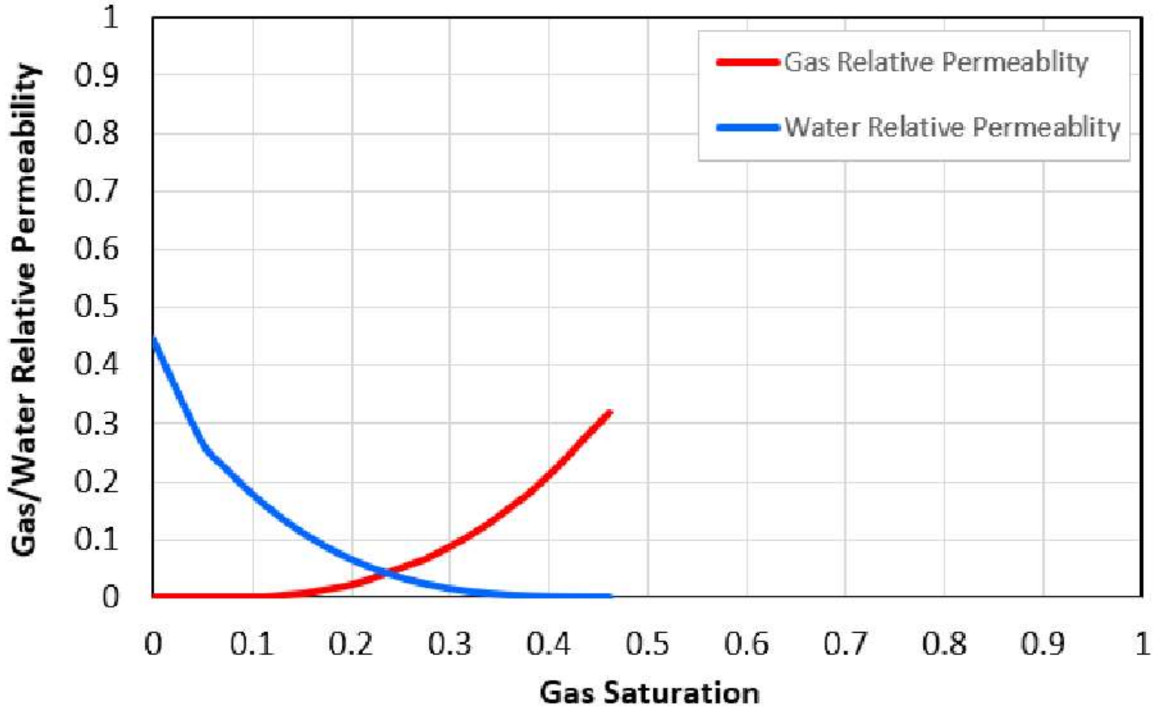

Figure 3.10. Relative permeability curves for Gas-Water System.

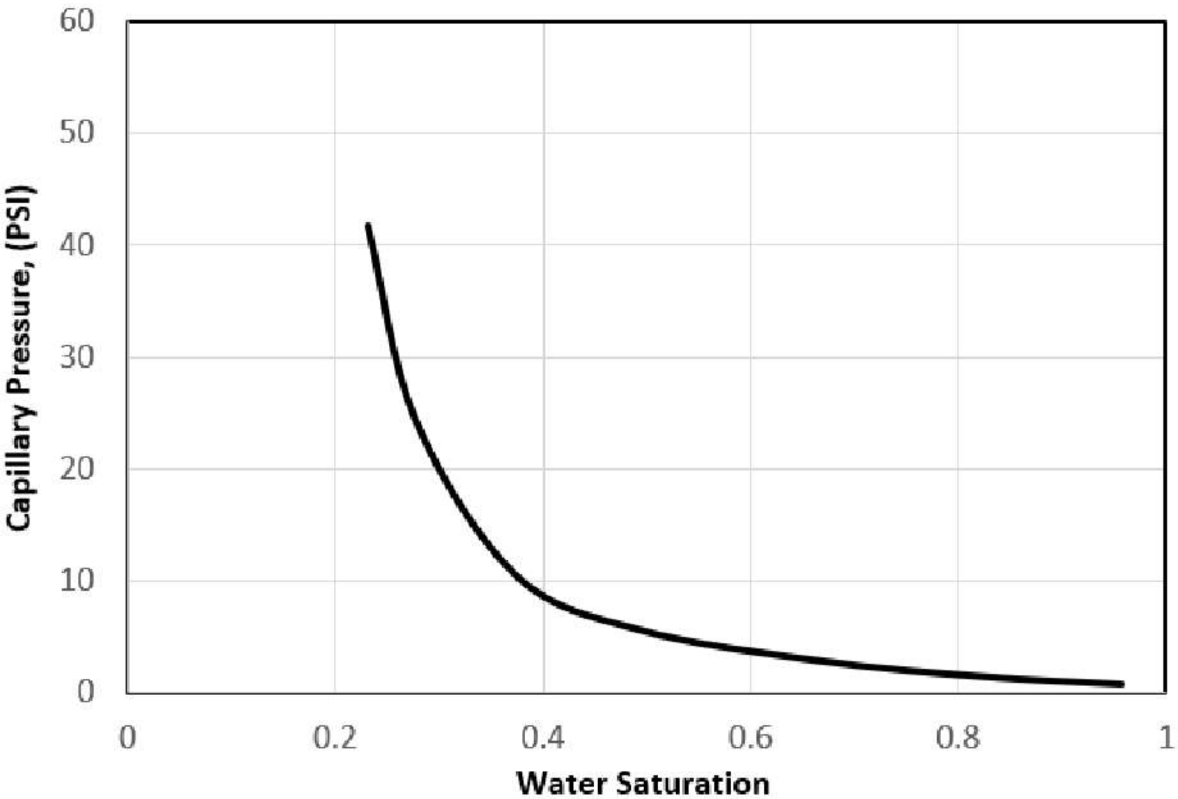

Figure 3.11: Capillary Pressure Curve.

[redacted]

Figure 3.12. [redacted].

[redacted]

Figure 3.13. Plume development through time: 1-year, 5-year, 10-year, 15-year, 20-year, 23-year (end of injection), 32-year post injection, and 100-year post injection.

[redacted]

Figure 3.14. Cross-sections showing the plume development at varying times through the project. Location of section A-A' is shown on the inset map in Figure 3.4.

Figure 3.15. CO_2 storage mechanisms in the reservoir.

[redacted]

Figure 3.16. Map showing the location of injection wells and monitoring wells.

[redacted]

Figure 3.17. Wells penetrating [redacted] reviewed for corrective action.

[redacted]

Figure 3.18. Wells to be abandoned prior to injection.

AREA OF REVIEW AND CORRECTIVE ACTION PLAN - TABLES

[redacted]

Table 3.2: Model domain information.

Coordinate System	California State Plane		
Horizontal Datum	North American Datum (NAD) 27		
Coordinate System Units	Feet		
Zone	Zone 2		
FIPSZONE	[redacted]	**ADSZONE**	[redacted]
Coordinate of X min	[redacted]	**Coordinate of X max**	[redacted]
Coordinate of Y min	[redacted]	**Coordinate of Y max**	[redacted]
Elevation of bottom of domain	[redacted]	**Elevation of top of domain**	[redacted]

[redacted]

Table 3.4: Initial conditions (start of CO_2 Injection).

Parameter	Value or Range	Units	Corresponding Elevation (ft MSL)	Data Source
Temperature	218	Fahrenheit	[redacted]	Fluid Analysis
Formation pressure	1,200	Pounds per square inch	[redacted]	Pressure Test
Fluid density	61	Pounds per cubic foot	[redacted]	Water analysis
Salinity	15,000	Parts per million	[redacted]	Water analysis

Table 3.5: Operating details.

[redacted]

Table 3.6: Injection pressure details.

Injection Pressure Details	Injection Well 1 [redacted]	Injection Well 2 [redacted]
Fracture gradient (psi/ft)	0.70	0.70
Maximum allowable bottomhole injection pressure (90% of fracture pressure) (psi)	6,021	6,061
Elevation corresponding to maximum injection pressure (ft TVD)	9,557	9,620
Elevation at the top of the perforated interval (ft TVD)	9,557	9,620
Planned bottom hole injection pressure at top of perforations (psi)	1541 - 4675	1469 - 4645
Planned bottom hole injection gradient at top of perforations (psi/foot)	0.16 - 0.49	0.15 - 0.48

Table 3.7: Simulation sensitivity scenarios.

Scenario	CO2 plume & AoR impact
Porosity: 10% reduction from base case	Minimal Impact
Porosity: 10% increase from base case	Minimal Impact
Permeability: 10% reduction from base case	Minimal Impact
Permeability: 10% increase from base case	Minimal Impact

Table 3.8: Wellbores in the AoR by Status.

[redacted]